IN THE UNITED STATES PATENT AND TRADEMARK OFFICE AF/2874 SFW

In re application of:	William J. Anderl, et al.	:	Date: February 28, 2006
Group Art Unit:	2874	:	IBM Corporation
Examiner:	T. Wong	:	Intellectual Property Law
Serial No.:	09/809,699	:	Dept. 917, Bldg. 006-1
Confirmation No.:	3563	:	3605 Highway 52 North
Filed:	March 15, 2001	:	Rochester, MN 55901

OIPE IAP55 MAR 03 2006 PATENT & TRADEMARK OFFICE

Title: COMPACT OPTICAL TRANSCEIVERS INCLUDING THERMAL DISTRIBUTING AND ELECTROMAGNETIC SHIELDING SYSTEMS AND METHODS THEREOF

To: Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDED APPEAL BRIEF IN SUPPORT OF APPEAL FROM THE PRIMARY EXAMINER TO THE BOARD OF APPEALS

Applicants herewith submit an amended appeal brief in support of the appeal to the Board of Appeals from the decision dated October 14, 2005, of the Primary Examiner finally rejecting claims 1-3, 5 and 6. This amended appeal brief is submitted in response to Notification of Non-Compliant Appeal Brief dated February 15, 2006, and replaces the previously submitted appeal brief dated January 19, 2006.

No fee is required for this amended appeal brief, the appeal brief fee having been paid previously. The Commissioner is authorized to charge any additional fees required under 37 CFR 1.16 or 37 CFR 1.17 or credit any overpayment to Deposit Account No. **09-0465**. A duplicate copy of this sheet is enclosed.

Date: February 28, 2006

Respectfully submitted,

WILLIAM J ANDERL, et al.

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CERTIFICATE OF MAILING UNDER 37 CRF 1.8(a)

I hereby certify that the enclosed or attached correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on

February 28, 2006
Date of Deposit

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Roy W. Truelson

Docket No. ROC920010018US1
Serial No. 09/809,699

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 223313-1450

AMENDED APPEAL BRIEF IN SUPPORT OF APPEAL
FROM THE PRIMARY EXAMINER TO THE BOARD OF APPEALS

Sir:

This is an appeal of a Final Rejection under 35 U.S.C. §103(a) of claims 1-3, 5 and 6 of Application Serial No. 09/809,699, filed March 15, 2001. This brief is submitted pursuant to a Notice of Appeal filed October 19, 2005, as required by 37 C.F.R. §1.192. This brief is an amended version responsive to the Notice dated February 15, 2006.

1. Real Party in Interest

International Business Machines Corporation of Armonk, NY, is the real party in interest. The inventors assigned their interest as recorded on June 8, 2001, on Reel 011873, Frame 0126.

2. Related Appeals and Interferences

There are no related appeals nor interferences pending with this application.

3. Status of Claims

Claims 1-3, 5 and 6 are pending and stand finally rejected. Claims 4, 7 and 8 are allowed. Claims 27 and 28 are cancelled. Claims 9-26, 29 and 30 are withdrawn from consideration as directed to non-elected inventions. The claims on appeal are set forth in the Appendix of Claims

4. Status of Amendments

Following Final Rejection on October 14, 2005, and the Notice of Appeal on October 19, 2005, a proposed amendment was submitted on December 7, 2005. By telephone conversation in December with James Nock, attorney for the appellants, the Examiner indicated that appellants' proposal was not accepted.

5. Summary of Claimed Subject Matter

The invention herein relates to an optical transceiver assembly for use in digital communications. An optical transceiver [10] is a device which converts electrical logic signals to optically-transmitted (i.e.laser) signals for transmission through an optical medium to a remote device, and vice-versa (Spec p. 1, line 18 - p. 2, line 5). In the design of such devices, form factor, excessive heat and electro-magnetic interference (EMI) are significant design considerations (Spec, p. 2, line 9 - p. 3, line 28). Since such optical

transceivers are typically designed to receive a coupling for an optically-transmissive cable, one end [20] of an optical transceiver is mounted in an opening [24] in a wall [22] which is part of a structure enclosing a digital logic device such as a computer system, and contains at least one connector port [100] for receiving the optical cable coupling (Spec. p. 10, line 18 - p. 11, line 3; p. 18, lines 14-18). The transceiver module end [20] mounted in the wall opening [24] forms at least one vent passage [104, 110] within the wall opening [24], allowing cooling air to pass through the vent and over certain internal components (Spec. p. 18, line 19 - p. 19, line 23). Because electro-magnetic interference is a concern, the vent, the opening and the optical transceiver are preferably shielded[1] (Spec p. 20, lines 17-20). In the preferred embodiment, shielding includes a screen assembly [122] covering the vents[2] (Spec p. 20, line 17 - p. 21, line 23).

6. Grounds of Rejection To Be Reviewed on Appeal

Claims 1 and 5 are finally rejected under 35 U.S.C. §103(a) as unpatentable over Sayers et al. (U.S. Patent 6,556,811). Claims 2, 3 and 6 are finally rejected under 35 U.S.C. §103(a) as unpatentable over *Sayers* in view of Steffensen et al. (U.S. Patent 6,858,769). The only issue in this appeal is whether the claims are prima facie obvious in view of *Sayers* and *Steffensen*.

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[1] As claimed in dependent claims 2 and 6.

[2] As claimed in claims 4, 7 and 8, which have been allowed and are not at issue in this appeal.

7. Argument

Appellants assert that the Examiner failed to establish adequate grounds of rejection for the following reasons:

Sayers discloses a wireless transceiver, having different design constraints from an optical transceiver, and there is no teaching or suggestion to modify *Sayers* to provide an optical transceiver as claimed by appellants, nor is there a suggestion to combine *Sayers* with a reference teaching an optical transceiver.

Neither *Sayers* nor *Steffensen*, considered alone or in combination, discloses the key feature of appellants' claimed invention, i.e., vents arranged in the end of an optical module occupying the enclosure opening, and a suggestion to modify the references to provide such vents is lacking.

Steffensen teaches the necessity of completely sealing the connector end of an optical tranceiver module to avoid electro-magnetic interference, and therefore teaches away from appellants' invention

Although appellants' screen provides an important shielding function, appellants are entitled to claim their invention in broad terms without reference to shielding.

Overview of Invention

A brief overview of appellants' invention in light of existing art will be helpful in appreciating the issues herein. Appellants' invention relates to the design of ***optical transceiver modules*** for supporting data communication between digital devices. The invention is directed in particular to the problem of providing sufficient cooling means for an optical transceiver module.

An optical transceiver module must be designed within certain narrow engineering constraints. The function of an optical transceiver module is to provide an interface between digital electronic logic within a digital device, and a fiber-optic data

communication cable running externally to a remote device. Due to the high data speed of optical communications, it is undesirable to mount such an optical transceiver outside the digital device, for such a mounting would make it difficult or impossible to maintain the high optical communication speeds between the optical transceiver and its digital device. For this reason, optical transceiver modules are mounted internally within the digital device. However, it is further necessary to couple the optical transceiver to the external fiber-optic cable. For convenient coupling to the fiber-optic cable, the optical transceiver is typically mounted adjacent to the enclosure ("wall") which encloses the digital device, and with one end of the optical transceiver module occupying an opening in the enclosure. The optical transceiver module end which occupies the enclosure opening contains one or more fiber-optic connector couplings for one or more external fiber-optic cables.

Another engineering constraint is electro-magnetic interference. Usually, an enclosure for a digital device such as a computer provides electro-magnetic shielding for the internal components. Since the optical transceiver module is mounted in an opening in the enclosure, and the transceiver itself can generate significant radiation, the enclosure generally does not provide adequate shielding, and electro-magnetic interference is a significant concern. An optical transceiver module is typically designed to provide shielding over the opening in the enclosure to alleviate this problem. Appellant notes that the *Steffensen* reference cited by the Examiner is directed to this very problem.

Another significant design constraint is the provision of adequate cooling means. An optical transceiver module contains components which generate significant amounts of heat in a small space. Various heat sinks, cooling fins and the like are known in the art to provide adequate cooling to the optical transceiver module. Appellant further notes that the

Steffensen reference cited by the Examiner discloses an array of cooling fins on one surface of the module.

Although certain prior art techniques exist for reducing heat accumulation in an optical transceiver module, adequate cooling remains a major design concern, and is likely to be a continuing problem as transmission speeds increase and form factors shrink. In accordance with appellant's invention, improved cooling of an optical transceiver module is provided by forming one or more vents in the end of the module which occupies the opening in the enclosure, i.e., in the end of the module which is in direct communication with ambient air outside the enclosure. Because such vents would otherwise create breaks in the electro-magnetic shielding, appellants further provide an auxiliary shield in the form of a screen mounted at an oblique angle to the wall of the enclosure.

The provision of cooling vents in the end of an optical transceiver module which *occupies the opening in the wall of a device enclosure* is a significant feature of appellants' invention claimed herein.

Sayers discloses a wireless transceiver, having different design constraints from an optical transceiver, and there is no teaching or suggestion to modify _Sayers_ to provide an optical transceiver as claimed by appellants, nor is there a suggestion to combine _Sayers_ with a reference teaching an optical transceiver.

Sayers, the primary reference relied upon by the Examiner, discloses a transceiver unit for receiving and sending wireless communications, i.e., communications carried as atmospheric electro-magnetic radiation, such as radio frequency. The design of a wireless transceiver involves fundamentally different design constraints from those applicable to the design of an optical transceiver module as claimed by appellants. First, because wireless is

relatively low speed compared with fiber-optics, a wireless transceiver unit is not constrained to be mounted ***within*** a digital device enclosure to provide proximity to the digital logic. On the contrary, it is often mounted ***outside*** the digital device, and connected to the digital device by a wired cable. This is apparently the expected mounting arrangement of *Sayers'* device. Mounting outside a digital logic device is further preferred because the wireless transceiver must necessarily receive and transmit atmospheric electro-magnetic radiation. The electro-magnetic shielding typically provided by the enclosure of a computer system or similar device would necessarily inhibit wireless reception and transmission.

Thus, contrary to the optical transceiver, in which mounting within a shielded enclosure is desirable to avoid electro-magnetic interference, mounting a wireless transceiver within a shielded enclosure defeats its function.

It is clear from the context that, by reference to "wall mounting", *Sayers'* ***wireless transceiver*** is designed to be mounted on a wall of a building, furniture, or similar structure, away from electro-magnetic interference by a computer or similar device. Appellants' ***optical transceiver*** is mounted in the opening of a wall of a digital data system. As explained above, the wall opening in a digital data system normally creates a break in the electro-magnetic shield, which is intended to be sealed by the optical module.[3]

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[3] Although the Examiner made no distinction between appellants' claims 1 and 5, appellants note that claim 5 explicitly recites a "a data transfer system .. includ[ing] a wall having a wall opening therein", while claim 1 recites only a "wall opening". Thus, it is explicit in claim 5 that the wall and wall opening are part of the "data transfer system". Although claim 1 does not explicitly recite a data transfer system, it is clear from the context that the recited "wall opening" is an opening in a wall of some form of digital device. Specifically, claim 1 recites an optical transceiver module, and it is well known in the art that such devices are mounted within device enclosures of computers and the like to provide high data rates, and mounted in the opening of a wall of the enclosure to provide connection to the fiber-optic cable. However, to

It is all too easy to conclude that the presence or absence of an opening in the wall, a vent formed in the opening, or similar feature is obvious. But it is the fundamental distinction between an optical transceiver module and a wireless transceiver that dictates all downstream design considerations. The constraints which govern an optical transceiver module do not govern *Sayers*' wireless transceiver, and *Sayers* has a great deal more freedom to place vents and other features arbitrarily. There is simply nothing in *Sayers* which suggests the various design difficulties of mounting an optical transceiver in such an opening and providing sufficient electro-magnetic shielding and cooling therein. And specifically, there is nothing is *Sayers* which teaches or suggests the construction of an optical transceiver module, the mounting of that module in the opening of a device enclosure, and the provision of a cooling vent in the opening which allows ambient air to flow therethrough.

Furthermore, for the various reasons explained above, it should be apparent that it was improper to combine *Sayers* and *Steffensen*. *Steffensen* teaches an optical transceiver module, which is fundamentally different from *Sayers*' wireless transceiver. Each device has its own respective design constraints, and optical modules are particularly constrained. The two modules are mounted differently and electronically coupled to a host device differently. There is simply no suggestion in either reference to combine various aspects of the module design from each reference.

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the extent that the Appeal Board disagrees with appellant's explanation of claim 1, claim 5 explicitly recites that the wall is part of a "data transfer system", and the arguments made herein apply with full force to claim 5.

Neither *Sayers* nor *Steffensen*, considered alone or in combination, discloses the key feature of appellants' claimed invention, i.e., vents arranged in the end of an optical module occupying the enclosure opening, and a suggestion to modify the references to provide such vents is lacking.

As stated above, it is appellants' contention that the combination of *Sayers* as *Steffensen* was improper. But even assuming such a combination was proper, it fails to teach or suggest the claimed features of appellants' invention. In order to support a rejection for obviousness, there must be some suggestion in the art to combine the references in such a manner as to form each and every element of appellants' claimed invention. It is not sufficient that a suggestion may exist to combine the references, if such a combination does not meet the limitations of appellants' claims without some further non-obvious modification.

Appellants' claim 1 recites:

> 1. A method of cooling an optical transceiver that is mountable in a wall opening, said method comprising the steps of:
>
> providing an optical transceiver having at least one end portion that is insertable within the wall opening; and,
>
> ventilating ambient air over a major surface portion of the optical transceiver by mounting the one end portion to the wall opening so that at least one vent is formed within confines of the wall opening which allows air to pass therethrough and over the major surface portion of the optical transceiver.

Claim 5 is similar and additionally recites a "data transfer system", the wall being part of the data transfer system, as noted above.

Steffensen discloses an optical module having an end which is insertable in a wall opening, but does not disclose any portion of the second step, i.e., ventilating ambient air through a vent in the wall opening. *Sayers* discloses a wireless transceiver module. *Sayers'* module indeed has vents, but the step of "ventilating ambient air..." is not shown.

Specifically, *Sayers*' module is not designed to be mounted in a wall opening so that a vent is formed in the confines of the wall opening.

The Examiner seems to reason that since *Sayers*' module has vents, you could mount those vents just about anywhere, including within the opening of a wall. This is just the type of hindsight that is impermissible. Appellants are compelled to ask: where in *Sayers* or in *Steffensen* does the Examiner finds suggestion for this construction?

The problem with the Examiner's analysis is that, having ignored the fundamental distinction between a wireless transceiver and an optical transceiver, the Examiner simply takes any desired characteristic of the wireless transceiver and combines it willy-nilly with characteristics of an optical transceiver. Perhaps it is true that you could mount a ***wireless transceiver*** in any arbitrary orientation, and put its vents in a wall opening, although appellants don't see any suggestion in *Sayers* to do so. But the Examiner does not bother to explain why it would be obvious to import this characteristic to an ***optical transceiver***. As explained above, the optical transceiver is normally mounted internally and had specific design constraints, among them being the need to prevent electro-magnetic leakage and interference. The end of the optical transceiver which mounts in the wall opening is not just some arbitrary end, but performs a specific function, i.e., it contains the fiber-optic cable connectors. And this very end is normally sealed to contain electro-magnetic leakage. *Sayers* does not teach or suggest any of these considerations, and it would not have been obvious to modify *Sayers* (either alone or in combination with *Steffensen*) to provide an optical transceiver module which mounts in a wall opening and is cooled by passing ambient air through a vent formed in the opening.

Steffensen teaches the necessity of completely sealing the connector end of an optical tranceiver module to avoid electro-magnetic interference, and therefore teaches away from appellants' invention

It is undisputed that *Steffensen* teaches an ***optical*** transceiver module, and for that reason alone is much closer to appellants' claimed invention, and much more relevant, than *Sayers*.

What specifically does *Steffensen* disclose? *Steffensen*'s invention is directed to a mechanism for providing effective electro-magnetic shielding at the end of an optical transceiver module, specifically by providing a shielding gasket to seal against radiation leaks around the optical couplings. Thus, the thrust of *Steffensen* is to provide tighter sealing of the exposed end of the optical module. *Steffensen* teaches that this end of the module (i.e., the end containing the optical connectors, which is intended to be mounted in an opening in a wall of a computer system or similar device) is to be ***completely sealed***. To do otherwise defeats the purpose of *Steffensen*'s device, and is contrary to their teaching.

The key feature of appellants' claimed invention is a vent in the end of the optical module which fits in the wall opening, i.e., the end containing the optical connector(s). Because *Steffensen* teaches the necessity or desirability of avoiding radiation leakage in an optical transceiver, and teaches an optical transceiver module having a completely sealed connector end to avoid radiation leakage, it teaches away from appellants' claimed invention.

Although appellants' screen provides an important shielding function, appellants are entitled to claim their invention in broad terms without reference to shielding.

In their arguments above, appellants have made reference to the optical transceiver design constraints imposed by the need for effective electro-magnetic shielding. In appellants' preferred embodiment, a shield in the form of an obliquely-mounted screen is provided for the vents. But, it will perhaps be argued, the broadest claims at issue in this appeal do not recite shielding, and certain narrower claims recite shielding generally without reciting the screen used by appellants.[4]

Appellants are entitled to claim their invention in the broadest possible terms. The need for shielding in the design of an optical transceiver is relevant to the question of obviousness of appellants' claimed invention. I.e., because shielding is so important, vent holes can not be arbitrarily located in an optical transceiver module. Vents formed in the wall opening and exposed to ambient air form an obvious source of radiation leakage. As a result, a person of ordinary skill in the art would not have been motivated to place holes in the connector end of an optical module.

It was indeed necessary for appellants to solve the problem of radiation leakage as a step in designing a practical optical transceiver in accordance with the present invention, and they did so by placing an obliquely-mounted screen adjacent the vents. However, appellants are not required to claim every feature of their preferred embodiment. The most essential feature of the present invention remains the use of cooling vents in the connector

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[4] Allowed claims 4, 7 and 8 recite placing an EMI screen near the vents. The Examiner apparently considered this limitation crucial to allowability.

end of the optical transceiver. The broadest claims herein essentially claim vents in the connector end of the module for passage of ambient cooling air, without reciting shielding.

Within the scope of appellants' broadest claims, it may be possible to design other optical modules which do not include the EMI screen recited in allowed claims 4, 7 and 8, or do not include any other shielding structure near the vents. The fact remains that the prior art of which appellants and the Examiner are aware does not teach or suggest ***any*** optical module containing vents in the connector end, either with or without shielding. Appellants are accordingly entitled to claim their invention in just those terms.

If, however, the Appeal Board is of the opinion that recitation of shielding is required for patentability, dependent claims 2 and 6 further recite shielding (without reciting more specific details of the EMI screen of appellants' preferred embodiment), and are further patentable for that reason.

8. Summary

Appellants disclose and claim an optical transceiver module having vents in the end which occupies a wall opening in a digital device, i.e. the end containing the connector for a fiber-optic cable. Although many optical transceiver module designs exist in the prior art, vent holes in the connector end have not been employed because of the inherent radiation leakage. Thus, although vents may be placed in various locations in other types of devices and modules, it would not have been obvious to place vents in the connector end of an optical transceiver module. Appellants solve the problem of radiation leakage with an obliquely mounted EMI screen, thereby providing a practical optical transceiver module having vents in the connector end. The primary reference cited by the Examiner discloses a

module for wireless communications to be mounted outside a computer or similar device, and its teachings are not generally applicable to optical transceiver modules. The secondary reference does indeed disclose an optical transceiver module, but one in which the connector end is tightly sealed to prevent radiation leakage. There is nothing in either reference, alone or in combination, to suggest placing vents in the connector end of an optical transceiver module, as recited in appellants' independent claims.

For all the reasons stated herein, the rejections for obviousness were improper, and appellants respectfully request that the Examiner's rejections of the claims be reversed.

Date: February 28, 2006

Respectfully submitted,

WILLIAM J. ANDERL, et al.

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Roy W. Truelson

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APPENDIX OF CLAIMS

1. A method of cooling an optical transceiver that is mountable in a wall opening, said method comprising the steps of:

providing an optical transceiver having at least one end portion that is insertable within the wall opening; and,

ventilating ambient air over a major surface portion of the optical transceiver by mounting the one end portion to the wall opening so that at least one vent is formed within confines of the wall opening which allows air to pass therethrough and over the major surface portion of the optical transceiver.

2. The method of cooling as set forth in claim 1 further comprising the step of: shielding the optical transceiver, the vent, and the wall opening from electromagnetic interference.

3. The method of cooling as set forth in claim 2 further comprising the steps of: providing the optical transceiver with at least one connector port at the one end portion and providing the vent adjacent to and at least partially surrounding the connector port.

4. A method of cooling an optical transceiver that is mountable in a wall opening, said method comprising the steps of:

providing an optical transceiver having at least one end portion that is insertable within the wall opening; and, ventilating ambient air over a major surface portion of the optical transceiver by mounting the one end portion to the wall opening so that at least one vent is formed within confines of the wall opening which allows air to pass therethrough and over the major surface portion of the optical transceiver; shielding the optical transceiver, the vent, and the wall opening from electromagnetic interference; further comprising the steps of: providing the optical transceiver with at least one connector port at the one end portion and providing the vent adjacent to and at least partially surrounding the connector port; wherein said shielding step further comprises placing an electromagnetic screen assembly adjacent to and covering the vent.

5. A method of cooling a data transfer system in combination with an optical transceiver wherein the system includes a wall having a wall opening therein; said method includes the steps of:

providing an optical transceiver having at least one end portion that is insertable within the wall opening; and,

ventilating ambient air over a major surface portion of the optical transceiver by mounting the one end portion to the wall opening so that at least one vent is formed within confines of the wall opening which allows air to pass therethrough and over the transceiver, whereby the transceiver and internals of the data transfer system are cooled.

6. The method of cooling as set forth in claim 5 further comprising the step of:

shielding the optical transceiver end portion, the vent, and the wall opening from electromagnetic interference.

7. A method of cooling a data transfer system in combination with an optical transceiver wherein the system includes a wall having a wall opening therein; said method includes the steps of:

providing an optical transceiver having at least one end portion that is insertable within the wall opening; and,

ventilating ambient air over a major surface portion of the optical transceiver by mounting the one end portion to the wall opening so that at least one vent is formed within confines of the wall opening which allows air to pass therethrough and over the transceiver, whereby the transceiver and internals of the data transfer system are cooled; shielding the optical transceiver end portion, the vent, and the wall opening from electromagnetic interference: and wherein said shielding step further comprises the step of placing an electromagnetic interference screen assembly adjacent to and covering the vent.

8. A method of cooling a data transfer system in combination with an optical transceiver wherein the system includes a wall having a wall opening therein; said method includes the steps of:

providing an optical transceiver having at least one end portion that is insertable within the wall opening;

ventilating ambient air over a major surface portion of the optical transceiver by mounting the one end portion to the wall opening so that at least one vent is formed within confines of the wall opening which allows air to pass therethrough and over the transceiver;

shielding the optical transceiver end portion, the vent, and the wall opening from electromagnetic interference; said shielding step further comprises the step of placing an electromagnetic screen assembly adjacent to and covering the vent; and,

providing the optical transceiver with at least one connector port at the one end portion and providing the vent to be adjacent to and at least partially surrounding the connector port.

9-26. (Withdrawn)

27-28. (Cancelled)

29-30. (Withdrawn)

APPENDIX OF EVIDENCE

No evidence is submitted.

APPENDIX OF RELATED PROCEEDINGS

There are no related proceedings.